REDUCTION OF FIRE IN JHARIA COALFIELD

- The coal mining operations in the Jharia Coalfield have been done since more than 100 years by the erstwhile private owners. Due to the un-scientific mining methods adopted by them, large areas of coal mines were subjected to mine fires and subsidence which had resulted in serious social and environmental problems in the area. By the time of the nationalization of coal mines in 1972-73 and taking over the mines by BCCL, the situation of mine fires was grave. Since then the fires have been increased day by day extending to an area of about 9 sq.km. as assessed by a World Bank team. These fires could not be controlled even after spending more than Rs.100 crores through various methods like sand flushing, chemical treatment, blanketing etc.
- However after adopting **Strategic Plan** , fire area has reduced from 8.9 sq.km(as assessed in Master Plan). to 2.18 sq.km as per the satellite survey done by National Remote Sensing Centre, ISRO, Deptt. of Space, Hyderabad(March-2014). This could be achieved only due to the successful "excavation method i.e. digging out of fiery coal" adopted by BCCL. This fact has also been acknowledged by NRSC in their report. This 2.18 sq.km. fire area is in the locality where BCCL colonies, encroacher colonies and other residents are situated in fire affected Jharia Coalfield pockets.

Fire excavation at Muraidih Fire excavation at Bararee

Fire excavation at Ena OC

DELINEATION OF SURFACE COAL FIRE IN THE JHARIA COALFIELD, DHANBAD, JHARKHAND USING REMOTE SENSING DATA

In order to manage effectively the coal fire menace, it is essential to know the exact location and extent of the fire affected areas. Remote sensing technique in thermal band offers a cost-effective and time-saving technology for mapping various geoenvironmental / hazardous features like coal fires, forest fires, oil well fires, volcanic eruptions etc.

A Memorandum of Understanding between BCCL and NRSC was signed on 15th of July, 2013 and a project was formulated to take up Coal fire study of the Jharia Coal Field using space-borne remote sensing techniques to study the status of coal-fire as of the year 2012.

The objective of project was

I. Mapping of Coal fire in the study area based on pixel integrated relative radiant temperature derived from ASTER data of 2012.
II. Comparison of the change in the coal fire distribution in the Jharia coalfield within the period of 2006 and 2012.

SUMMARY OF REPORT

Remote Sensing Data

The ASTER (Advance Spaceborne Thermal Emission Radiometer) data was procured from ERSDAC, Japan of May, 2012. However, considering that the time gap between ASTER data (dated on 2012) and the field verification program (early 2014), a nearest available thermal satellite data in conjunction to the fieldwork, was required. A coal fire map generated from the same, would serve as a reference for the fieldwork, as the observations can be verified in the field and further cross-referred with the ASTER data of 2012. For this purpose, a coal fire map derived from LANDSAT 8 TIRS data of December 2013 was taken, to be the basis of the fieldwork.

Analysis

Almost all the coal mine fires are restricted to the Barakar Formation where coal seams are subjected to atmospheric oxygen. In the eastern flank of the arcuate shaped mining extent, the collieries in Bhowra, North Tisra, Kujama, Gonhoodih and Bastacolla are affected by multiple fire pockets. The fire in the areas is mostly manifested by high temperature fume cracks with occasional presence of active flames. The fire pockets are discontinuous and are not extensive. **This is probably due to the large scale mitigation measures that are being taking place to excavate and isolate the fire in these areas**. Further, towards the north east, in Ena, Kusunda and Kenduadih, active fires are more prevalent and the area is extensively affected. The highest radiant temperatures (in order of 60°C) are recorded by the satellite sensors in these areas. In the north, a large number of moderate to small fire pockets are seen in the areas around Shyambazar . These are related to the mining areas of Katras, Gaslitand, Mudidih and Bansjora. Mining activity, over the last few of years has exposed new, isolated and discontinuous fires in these regions.

In the western flank, two distinguishable fire affected zones are seen. Toward the western end of the mining area, the Benedih and Block II OCP are affected by smaller fires from isolated coal seams. These again are surfacialy manifested in the form of fume cracks with smoke emanating from them. Similarly, the Muraidih and Shatabdi OCP are also affected but with more extensive fire manifestations. **The fire zones in the Shatabdih and the Muraidih mines are continuously being excavated to isolate the affected coal seams. These efforts have resulted in overall decrease in the spatial extent of the fire and thereby its manifestation in the satellite data**. Two smaller locations are identified, in E. Katras (currently named as New Akashkinari). These are reported to be remnants of older fires. Lastly, the Bhulanbarari area, which was not manifested by iterative-regional thresholding, is another location of small but active fire.

Conclusions

The following conclusions can be made:

1. As of the date of study in the year 2012 and in comparison with the previous study done in 2006, there has been a change in areal extent and disposition of the fire affected areas.
2. Compared to 2006, the eastern flanks (Lodna, Tisra areas) and the western flank (Nadkhurkee, Shatabdi, Block II and Benedih area) show diminished fire presence.
3. New fire areas are observed in the northern flank in the areas around Katras, Gaslitand etc. These areas were not mapped as fire in the 2006 study.
4. The mines in Kusunda, Kenduadih and Ena remain to be the worst affected with maximum presence of active fires. This observation remains consistent to the findings as in 2006.
5. **There is a decrease in areal extent of the fire** from 2006 to 2012.
6. The areal extent of the fire is assessed to be 2.18 sq km.